Trend Study 25C-26-03

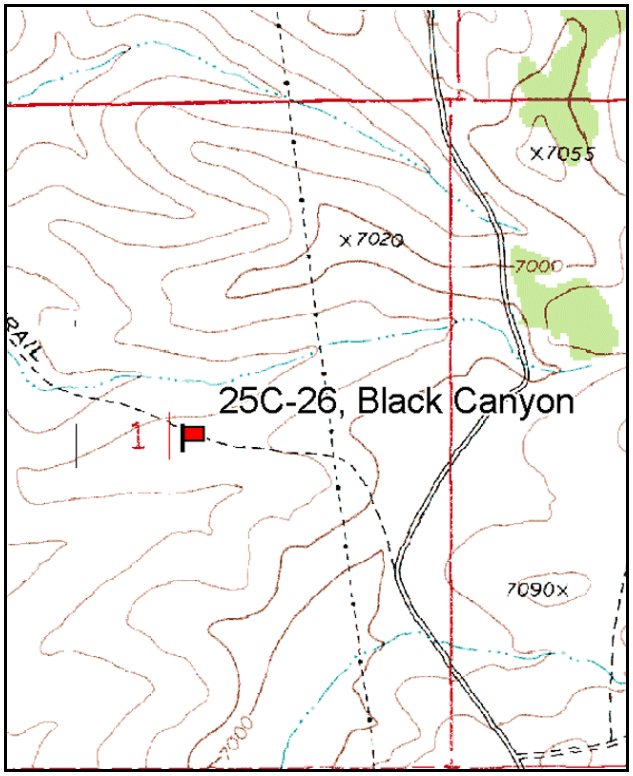
Study site name: Black Canyon . Vegetation type: Big-Black Sagebrush .

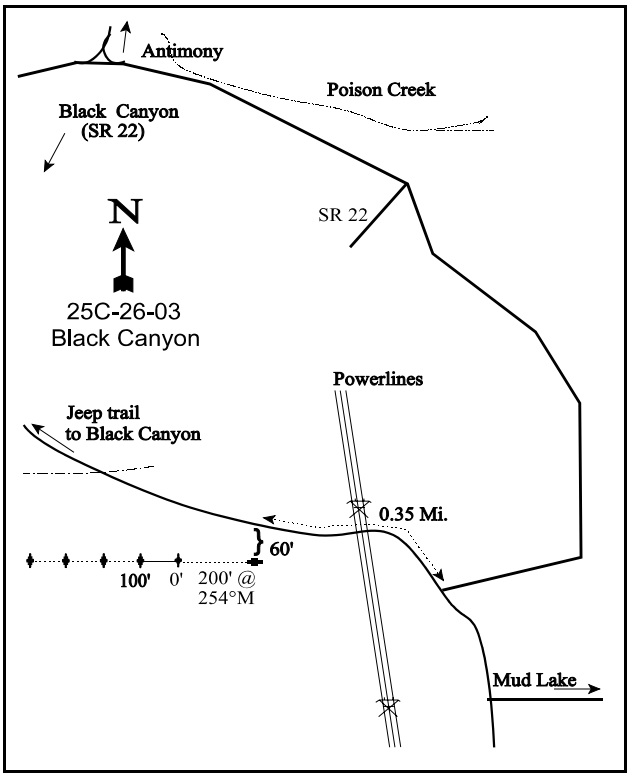
Compass bearing: frequency baseline 254 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Antimony, travel south on SR 22 to the turnoff to the Mud Lake road. Turn east, go along Poison Creek for 1.2 miles to a fork, stay right. Continue southeast for 2.2 miles to another major fork. At this point there is a faint jeep trail heading back to the north. Follow this jeep trail 0.35 miles, under the powerlines and up on the ridge to a green fence post (witness post) about 20 yards off the south side (left) of the road. The transect starts 200 feet west of the witness post. It is marked by $1^{1/2}$ foot tall fenceposts.





Map Name: Antimony

Diagrammatic Sketch

Township 32S , Range 2W , Section 1

GPS: NAD 27, UTM 12S 4211709 N, 416173 E

DISCUSSION

Black Canyon - Trend Study No. 25C-26

The Black Canyon trend study samples a critical deer winter range south of Antimony. Antelope also use the area during the fall and spring. The Wyoming big sagebrush range type dominates most of this low, rolling bench. The country is marked with short, dry washes which drain west into Black Canyon of the East Fork of the Sevier River. The study is set up on the top of a gentle ridge which is nearly level and has a slight eastern aspect near the start of the baseline, but more of a western aspect near the end. The elevation is 6,950 feet. Pellet group data from 1998 estimated 37 deer, 6 elk, and 19 antelope days use/acre (91 ddu/ha, 15 edu/ha, and 47 adu/ha). Cattle also used the area with 6 cow days use/acre estimated (15 cdu/ha). Some of the antelope pellet groups were more recent but all others appeared older. Pellet group data from 2003 estimated 15 deer/antelope and 4 cow days use/acre (38 ddu/ha and 10 cdu/ha). The area is within an allotment which receives spring use by cattle from May 15 to June 15.

The soil is rocky, hard-packed and moderately deep with an estimated effective rooting depth of almost 14 inches. Texture is a sandy clay loam which is neutral in reaction (pH 7.1). Phosphorus is low at only 3.5 ppm, when 10 ppm is thought to be the minimum necessary for normal plant development. A hard pan appears to be present starting around 14 inches in depth. There is a high percentage of coarse fragments in the profile and concentrated on the surface as erosion pavement. Evidence of slight surface (sheet) erosion is apparent and there is some movement of rock down slope. However, erosion does not appear to be serious due to the adequate protective ground cover combined with the gentle slope.

Except for the rocky slopes covered with pinyon-juniper, the dominant shrub for many miles is Wyoming big sagebrush. The plants are short in stature, and in some places are associated with black sagebrush. On the study site, there were only two plants identified as black sagebrush in 1991. Wyoming big sagebrush numbered 6,799 plants/acre in 1987 and 8,732 by 1991. During the 1998 and 2003 surveys, many of the sagebrush were classified as black sagebrush. It is apparent that these two species are hybridizing which makes identification difficult. Some plants had the color of Wyoming big sagebrush, but the growth form of black sagebrush and vice versa. Combined black/Wyoming big sagebrush density has remained relatively stable since 1987 estimates at around 7,000 plants/acre. Utilization was moderate to heavy in 1987 and 1991 but more light to moderate in 1998 and 2003. Vigor has been good on most plants during all readings but the number of plants displaying poor vigor was higher in 1991 and 2003, both drought years. Percent decadence has also been low with the exception of 1991 and 2003 which had moderate decadence rates of 27% and 32% respectively. Young recruitment was excellent in 1987 and 1991 and good in 1998. No seedlings or young plants were sampled in 2003 however.

Other common shrubs include two increasers, broom snakeweed and narrowleaf low rabbitbrush. During the 1987 reading, it appeared that the broom snakeweed population (11,999 plants/acre) would increase on the site. By 1991, the population had crashed from 11,999 plants/acre to only 2,266 plants/acre, an 81% decrease. This decline continued in 1998 to only 360 plants/acre before slightly increasing to 760 plants/acre in 2003. Narrowleaf low rabbitbrush has a more stable population of 1,065 plants/acre in 1987 declining slightly to 980 by 1998 and 1,160 plants/acre in 2003.

The herbaceous understory is poor and totally dominated by blue grama which provided nearly all of the herbaceous cover in both 1998 and 2003. Other grasses are rare. Only 5 forb species were sampled during the 1998 and 2003 readings. These forbs combined to produce less than 1% cover in 1998 and less than 1/10th of 1% cover in 2003. The lack of herbaceous vegetation lowers the value of this area for deer during the spring period.

1987 APPARENT TREND ASSESSMENT

Soil conditions are poor with abundant pavement cover and low litter cover on the site. However, exposed bare ground is low and there is little erosion occurring due to the gentle terrain. The browse component is in good condition. The key browse species is Wyoming big sagebrush which has an age class distribution of an expanding population. Use is moderate to heavy but vigor is good and decadence low. The herbaceous understory is poor and totally dominated by the low growing warm season, blue grama. Forbs are rare.

1991 TREND ASSESSMENT

Basic cover for soil changed little overall since 1987. There was some improvement of vegetative basal cover (12% to 15%) with increases in pavement cover (34% to 44%) and decreases in litter cover (36% to 25%). Generally, the trend is considered stable as long as there are no substantial increases in bare ground. The key browse species is Wyoming big sagebrush. It's population has grown by 22% to 8,732 plants/acre. The rate of decadency has risen to 26% which is not uncommon for a Wyoming sagebrush site, especially considering the past few years of below normal precipitation. The broom snakeweed population has experienced large reductions in density (11,999 down to 2,266 plants/acre) which again is not unusual during a long period of drought. Trend for browse is up. The herbaceous understory is mostly made up of one species, blue grama. By the inspection of the sum of nested frequencies for grasses and forbs, the trend is stable.

TREND ASSESSMENT
soil - stable (3)
browse - up (5)
herbaceous understory - stable (3)

1998 TREND ASSESSMENT

Trend for soil is stable with similar ground cover characteristics compared to 1991. The only significant change is in the decline in pavement cover from 44% to 34%. Trend for browse is stable. Density of black/Wyoming big sagebrush has declined, however this is almost all due to a decline in density of young plants which were extremely abundant in 1991. Currently, utilization is lighter, vigor improved and percent decadence is lower (26% to 11%). In addition, density of broom snakeweed has continued to decline to only 360 plants/acre. Trend for the herbaceous understory is stable. Sum of nested frequency of grasses declined slightly, although the frequency of the dominant grass, blue grama, remained similar to 1991 estimates. Sum of nested frequency of perennial forbs increased slightly. Composition is still poor and perennial forbs are lacking.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable, but poor (3)

2003 TREND ASSESSMENT

Trend for soil remains stable. There were some slight changes in ground cover characteristics but most remained stable. Erosion is not a problem on the site. Key browse consists of a mix of black sagebrush and Wyoming big sagebrush. Difficulty in distinguishing these hybridizing species requires combining sagebrush data to determine trends. Combined black/Wyoming big sagebrush density increased by about 1,000 plants/acre. On the down side, percent decadence increased from 11% to 32% and plants displaying poor vigor also increased. Use was lighter. No seedlings were sampled in 2003 and young plants were rare. In addition, nearly half (46%) of the decadent sagebrush sampled was classified as dying (>50% crown death). Due to the lack of young recruitment, it appears that the population will decline in the future. Taking this into consideration, trend for browse is considered slightly down. The number of mature sagebrush is basically

unchanged and it appears that some of the decadent plants will be thinned. A return to normal precipitation patterns should bring about an improvement in young recruitment. The herbaceous understory is poor and totally dominated by the low growing, warm season, blue grama. It provides 98% of the total grass cover and 97% of the total herbaceous cover. Two other native perennial species, bottlebrush squirreltail and needle-and-thread, occur rarely. Forbs are lacking with only 5 species sampled in 2003. All of these 5 species occurred in only 1 quadrat. Sum of nested frequency of perennial grasses declined slightly while nested frequency of perennial forbs declined more sharply. Trend is considered stable since blue grama remained stable in nested frequency.

TREND ASSESSMENT
soil - stable (3)
browse - down slightly (2)
herbaceous understory - stable, but poor (3)

HERBACEOUS TRENDS --
Management unit 25C, Study no: 26

Type	Species	Nested Frequency				Average Cover %	
		'87	'91	'98	'03	'98	'03
G	Aristida purpurea	$_{b}$8	$_{a}$-	$_{a}$-	$_{a}$-	-	-
G	Bouteloua gracilis	$_{b}$261	$_{ab}$251	$_{ab}$245	$_{a}$239	12.51	13.68
G	Sitanion hystrix	1	1	11	4	.06	.06
G	Sporobolus cryptandrus	$_{a}$2	$_{b}$17	$_{a}$3	$_{a}$-	.03	-
G	Stipa comata	11	12	8	14	.04	.28
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		283	281	267	257	12.65	14.03
Total for Grasses		283	281	267	257	12.65	14.03
F	Astragalus spp.	$_{b}$15	$_{b}$32	$_{b}$26	$_{a}$-	.48	-
F	Chenopodium spp. (a)	$_{a}$-	$_{b}$43	$_{a}$4	$_{a}$4	.01	.00
F	Descurainia pinnata (a)	-	-	-	3	-	.00
F	Draba spp. (a)	-	-	1	-	.00	-
F	Erigeron pumilus	$_{ab}$7	$_{a}$-	$_{b}$20	$_{a}$-	.15	-
F	Lesquerella spp.	-	-	-	2	-	.00
F	Machaeranthera canescens	1	-	-	1	-	.00
F	Phlox longifolia	5	1	5	1	.01	.00
F	Sphaeralcea coccinea	$_{b}$9	$_{ab}$6	$_{a}$-	$_{a}$-	-	-
F	Unknown forb-perennial	15	-	-	-	-	-
Total for Annual Forbs		0	43	5	7	0.01	0.00
Total for Perennial Forbs		52	39	51	4	0.64	0.01
Total for Forbs		52	82	56	11	0.66	0.02

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 25C, Study no: 26

Type	Species	Strip Frequency '98	Strip Frequency '03	Average Cover % '98	Average Cover % '03
B	Artemisia nova	56	81	6.09	10.05
B	Artemisia tridentata wyomingensis	73	38	5.59	5.55
B	Chrysothamnus viscidiflorus stenophyllus	12	23	.14	.90
B	Ephedra nevadensis	1	1	.03	.03
B	Gutierrezia sarothrae	13	24	.17	.41
B	Opuntia spp.	3	4	.03	.03
B	Pediocactus simpsonii	0	0	.00	-
Total for Browse		158	171	12.06	16.97

CANOPY COVER, LINE INTERCEPT --
Management unit 25C, Study no: 26

Species	Percent Cover '03
Artemisia nova	7.09
Artemisia tridentata wyomingensis	7.71
Chrysothamnus viscidiflorus stenophyllus	.88
Gutierrezia sarothrae	.33

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 25C, Study no: 26

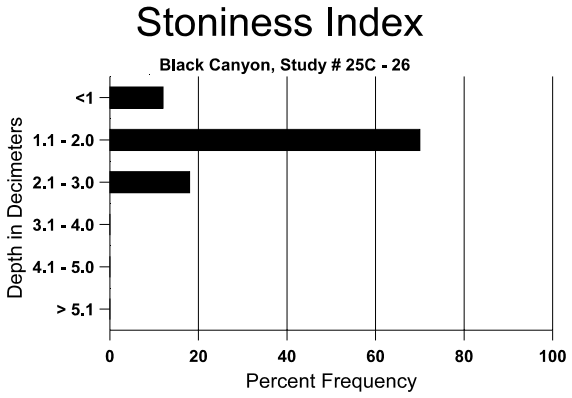
Species	Average leader growth (in) '03
Artemisia nova	0.8
Artemisia tridentata wyomingensis	1.1

BASIC COVER --
Management unit 25C, Study no: 26

Cover Type	Average Cover %			
	'87	'91	'98	'03
Vegetation	12.00	14.50	28.67	30.86
Rock	7.00	7.50	7.03	7.77
Pavement	34.00	43.75	34.29	32.42
Litter	36.25	24.50	21.10	21.11
Cryptogams	0	0	.59	.46
Bare Ground	10.75	9.75	11.03	16.04

SOIL ANALYSIS DATA --
Management unit 25C, Study no: 26, Study Name: Black Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
13.6	60.0 (9.5)	7.1	62.0	19.4	26.6	1.8	3.5	134.4	0.4



PELLET GROUP DATA --
Management unit 25C, Study no: 26

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Rabbit	13	2	-	-
Elk	2	-	6 (15)	-
Deer/Antelope	21	7	37 (91)	15 (38)
Cattle	1	-	6 (15)	4 (9)

BROWSE CHARACTERISTICS --
Management unit 25C, Study no: 26

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Artemisia nova											
87	**0**	-	-	-	-	-	0	0	0	0	-/-
91	**133**	-	-	-	133	-	100	0	100	50	-/-
98	**2800**	140	240	2160	400	620	14	.71	14	7	10/21
03	**6060**	-	20	4280	1760	880	8	.33	29	14	7/15
Artemisia tridentata wyomingensis											
87	**6799**	533	4400	2066	333	-	53	29	5	0	11/18
91	**8732**	133	4800	1666	2266	-	83	11	26	17	7/17
98	**3720**	180	520	2900	300	460	32	4	8	5	11/22
03	**1520**	-	-	820	700	140	21	0	46	20	16/33
Chrysothamnus viscidiflorus stenophyllus											
87	**1065**	66	666	333	66	-	13	0	6	0	10/13
91	**1599**	-	200	933	466	-	50	0	29	21	5/6
98	**980**	120	200	540	240	60	0	0	24	12	8/15
03	**1160**	-	-	860	300	120	0	0	26	5	7/12
Ephedra nevadensis											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**20**	-	20	-	-	-	0	0	-	0	12/14
03	**20**	-	-	20	-	-	0	0	-	0	15/10
Gutierrezia sarothrae											
87	**11999**	800	3333	8133	533	-	0	0	4	1	7/6
91	**2266**	66	333	1733	200	-	9	0	9	6	6/6
98	**360**	200	140	200	20	-	0	0	6	0	8/10
03	**760**	-	-	720	40	40	0	0	5	0	7/8
Opuntia spp.											
87	**66**	-	-	66	-	-	0	0	-	0	3/4
91	**66**	-	66	-	-	-	0	0	-	0	-/-
98	**60**	-	20	40	-	-	0	0	-	0	4/12
03	**80**	-	-	80	-	-	0	0	-	0	5/14